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Reminiscences 2

I first met Cal Elgot when we were both graduate students at Columbia University some thirty years ago. Computers were in their embryonic stage and pure mathematics was reaching some sort of climax. We studied pure mathematics, although we both had engineering backgrounds. Cal's interest in logic and abstract algebra developed in those early days and persisted throughout his life. I still remember his pleasure, as an eager graduate student, in learning the proofs of the equivalence of Zorn's lemma, the axiom of choice and the well-ordering theorem, which was one of the highlights of Columbia's graduate mathematics training in those days. My own interest in logic was less keen, but sufficient to initiate our friendship. At Columbia, Cal met another graduate student, Jane Kiefer, who was later to become his second wife and mother of his three daughters and two of his three sons.

The offerings in logic at Columbia were too meager to satisfy Cal's appetite for knowledge. Furthermore, as a young father, economic necessity dictated that he accept a position in the computer center of the Naval Ordnance Laboratory (NOL) in Maryland. University opportunities being what they were in the fifties, I later joined Cal at NOL after a year as a postdoctoral fellow at the University of Maryland. We cut our first computing teeth together on the CPC and the first 650 computer at NOL. Our labors and interests ran the gamut from numerical analysis, to wiring CPC boards, to programming languages and logic. I wrote a report on polynomial approximation and Cal did one on the Choleski square root method. However, it was clear that his main interests lay in what today we call theoretical computer science. He began work on high-level programming languages and wrote his first paper [1] on machines. Building on his ideas about programming, I developed the early high-level language called ADES. This was before FORTRAN, and just about the time that FORTRAN was being developed. Before we could bring our collaboration to a more fruitful point, Cal left NOL to continue his doctoral studies first at Berkeley and then in Michigan, where he had the opportunity to meet and work with Art Burks and Jess Wright, who also remained lifelong friends. Upon completing his doctorate there in 1960, and by then thoroughly caught up in the rapidly expanding research in the theory of computation, Cal accepted a position at the IBM Yorktown Heights research laboratories.

During the next twenty years, Cal enjoyed the research atmosphere at Yorktown and produced a number of original and influential results in the theory of computation. He was also very active in the international community of theoretical computer scientists, traveling widely throughout the world to lecture at meetings and universities. He was an early member of IFIP Working Group 2.2 (Formal Definition of Programming Concepts) and one of the original members of the editorial board of the *Journal of Computer and System Sciences.*

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In many conversations over the years of our friendship, one theme continually recurred. Excursions into pure theory and abstraction must ultimately be justified by some motivating connection with the real hard world of concrete objects. This may seem somewhat paradoxical to those who knew Cal only through his published works. These were often highly abstract and of a pure mathematics style more suited to those early Columbian days; perhaps that early influence never quite lost its hold on his mind. However, these sometimes abstruse papers were rooted deeply in a conscious ever-present desire to understand the world of real computers.

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